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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			JAGANNATHAN, MELANIE	
			ART UNIT	PAPER NUMBER
			2666	

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. X 10/034,340	Applicant(s) RUEHLE, MICHAEL D.	
	Examiner Melanie Jagannathan	Art Unit 2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 15-24 and 26-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-24 and 26-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

- Examiner has considered Amendment after Non-Final filed 9/29/2005.
- Claims 1-13, 15-24, 26-31 are pending.

Claim Objections

1. Claims 15, 26 are objected to because of the following informalities: Claim 15 depends from cancelled claim 14. Examiner will assume claim 15 depends from 13 for examination purposes. Claim 26 depends from cancelled claim 25. Examiner will assume claim 26 depends from 24 for examination purposes. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-6, 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Posner et al. US 4,807,280.

Regarding claims 1,6, the claimed determining integer factors of N, in which represents the number of signals to be permuted is disclosed by N input lines and to construct a cross-connect switch, the largest prime factor of N, N_c, is determined and is

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number of input and output lines for center stage switch module. Furthermore, N/N_c is decomposed into its prime factors to determine number of stages. See column 5, lines 55-57, lines 66-68, column 6, lines 1-34. The claimed selecting a configuration for layers of a permuting network based on the integer factors of N and one or more pre-selected type of switches and constructing the permuting network in layers by using the one or more pre-selected types of switches based on selected configuration is disclosed by N input lines and to construct a cross-connect switch, the largest prime factor of N , N_c , is determined and is number of input and output lines for center stage switch module. Furthermore, N/N_c is decomposed into its prime factors, f_i , to determine number of stages. If there are S prime factors, the cross-connect switch will have $2S+1$ stages. The cross-connect switch will be symmetric about center stage switch module with $f_i \times f_i$ switch modules. See column 5, lines 55-57, lines 66-68, column 6, lines 1-34. Examiner interprets the pre-selected types of switches to be that a formula is predetermined for modules and according to N , a particular cross-connect switch will have to be construct according to these "pre-selected" formulas.

Regarding claims 2-3, the claimed each of the types of switches is capable of selecting one signal from among a number of signals, the number being different for different types of switches and the claimed integer factors corresponds to number of signals that one type of switches can select from is disclosed by switches (Figure 3, element 101) in first stage select from two signals, switches in second stage (element 102) select from two signals, switches in third stage (element 103) selects from three

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signals, switches in fourth stage (element 104) select from 6 signals, and switches in fifth stage (element 105) select from three signals.

Regarding claim 4, the claimed selecting set of integer factors w_1, w_2, \dots, w_D such that $N = w_1 \times w_2 \times \dots \times w_D$ is disclosed by example where if $N=36$, factors are $6 \times 3 \times 2$. See column 6, lines 20-34.

Regarding claim 5, the claimed 2D-1 layers of switches, including $w_1:1, w_2:1, \dots, w_D:1$ switches is disclosed by $D=3$ and there are 5 stages in cross-connect switch with $2 \times 2, 3 \times 3$ and 6×6 switches. See column 6, lines 20-34.

Regarding claim 10, the claimed selecting set of integer factors w_1, w_2, \dots, w_D such that $N = w_1 \times w_2 \times \dots \times w_D$ is disclosed by example where if $N=36$, factors are $6 \times 3 \times 2$. The claimed 2D-1 layers of switches, including $w_1:1, w_2:1, \dots, w_D:1$ switches is disclosed by $D=3$ and there are 5 stages in cross-connect switch with $2 \times 2, 3 \times 3$ and 6×6 switches. See column 6, lines 20-34.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 7-9, 11-13, 15-19, 22-23, 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Posner et al. US 4,807,280.

Regarding claims 7-9, Posner et al. discloses all of the limitations of the claims except for each layer has N switches of same type. At the time it would have been obvious to modify Posner to have N switches in all 5 stages of cross connect matrix disclosed in Figure 3. One of ordinary skill in the art would be motivated to do so to permute each input line in each switch of next stage.

Regarding claims 11, 13, 18-19, 22-23, 28, the claimed N input and output terminals, N being an integer, $N = w_1 \times w_2 \times \dots \times w_D$, the claimed permuting network that connects input terminals to output terminals constructed from layers of switches that include $w_1:1, w_2:1, \dots, w_D:1$ switches is disclosed by N input and output lines and to construct a cross-connect switch, the largest prime factor of N, N_c , is determined and is number of input and output lines for center stage switch module. Furthermore, N/N_c is decomposed into its prime factors to determine number of stages. See column 5, lines 55-57, lines 66-68, column 6, lines 1-34. If there are S prime factors, the cross-connect switch will have $2S+1$ stages. The cross-connect switch will be symmetric about center stage switch module with $f_i \times f_i$ switch modules. See column 5, lines 55-57, lines 66-68,

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column 6, lines 1-34. Examiner interprets the pre-selected types of switches to be that a formula is predetermined for modules and according to N, a particular cross-connect switch will have to be construct according to these "pre-selected" formulas.

Posner et al. discloses all of the limitations of the claims except for each layer has N switches of same type. At the time it would have been obvious to modify Posner to have N switches in all 5 stages of cross connect matrix disclosed in Figure 3. One of ordinary skill in the art would be motivated to do so to permute each input line in each switch of next stage.

Regarding claim 12, the claimed each switch has input and output terminals, input terminals of switches in first layer coupled to N input terminals and output terminals of switches in last layer coupled to N output layers, and for all layers except last layer, the output terminals of switches are connected to input terminals of switches of next layer is disclosed by cross-connect switch of Figure 3 where there are 36 input lines to first stage, 36 output lines in last stage and inputs and outputs are connected in middle stages.

Regarding claim 15, the claimed 2D-1 layers of switches, each layer permuting the order of subsets of signal paths is disclosed by D=3 and there are 5 stages in cross-connect switch with 2X2, 3X3 and 6X6 switches permuting the original 36 input lines. See column 6, lines 20-34.

Regarding claims 16, 29, the claimed p-th layer of switches, p ranging from 1 to D, wp:1 switches are configured to form wp-by-wp permuters that are capable of permuting the ordering of wp signal paths is disclosed by D=3 and 1st to 3rd stages of

cross connect containing 2x2, 3x3, 6x6 switches to permute the order of signals selected from previous stages. The claimed q-th layer of switches, q ranging from D+1 to 2D-1, w2D-q :1 switches are configured to form w2D-q -by- w2D-q permuters that are capable of permuting the ordering of signal paths is 3x3 and 2x2 switches in fourth and fifth stages. See Figure 3 and column 6, lines 1-34.

Regarding claim 17, the claimed input terminals of each permuter in 2nd layer to (2D-1)th layer is connected to output terminal of a different permuter in previous layer is disclosed by 2nd stage 3x3 switches connected 6x6 switches connected to 3x3 switches connected to 2x2 switches. See Figure 3.

Regarding claims 24, 26-27, 30, Posner et al. discloses all of the limitations of the claims except for computer program stored on computer-readable media for causing computer system to perform steps disclosed above. At the time the invention was made it would have been obvious to translate steps into code for use by the layer network switches of Riemann et al. One of ordinary skill in the art would be motivated to do this for the efficiency due to an automated system.

6. Claims 20-21, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Posner et al. in view of Larson et al. US 4,833,468.

Posner et al. discloses all of the limitations except for first device being computer motherboard and second device being memory, permuting network being field programmable gate array. Larson et al. discloses switch chip, processor and memory (Figures 6 and 7). See column 11, lines 19-24. At the time the invention was made it

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would have been obvious to a person of ordinary skill in the art to modify Posner et al. with chips, processor and memory of Larson for efficient data fetching from memory.

7. Claims 24,26,27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Posner et al. in view of Beshai US 6,853,635.

Posner et al. discloses all of the limitations except for computer-readable media for assigning D-dimensional coordinate to each set of N signals, in successive operations, changing coordinates of N signals for particular dimension during each operation, such that after successive operations, the coordinates of N signals match a set of target coordinates. Beshai discloses N-dimensional lattice network with plurality of edge modules identified by N coordinates for addressing. Route-sets are computed for edge modules by permuting coordinates of edge modules. See column 2, 52-67, column 3, lines 1-42. At the time the invention was made, it would have been obvious to implement steps of coordinate permutation of Beshai into program code for use by Posner et al. One of ordinary skill in the art would be motivated to do so for efficiency of automated system.

Response to Arguments

8. Applicant's arguments with respect to claims 1-13, 15-24, 26-31 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Jagannathan whose telephone number is 571-272-3163. The examiner can normally be reached on Monday-Friday from 8:00 a.m.-4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ 
12/09/2005


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